Effects of Bank Credit Access on the Productivity of Small and Medium Manufacturing Enterprises Evidence from Ethiopia

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Abstract: The productivity of enterprises in low income countries like Ethiopia is insignificant and very low. This low productivity feature is even more common among Small and Medium Enterprises. This paper present the effects of access to bank credit on productivity of small and medium enterprises. The study makes use of the 2008/9 large and medium enterprises manufacturing survey data collected by the Central Statistical Authority (CSA) of Ethiopia and 2011 enterprises survey collected by World Bank respectively. The study is designed as a combination of descriptive and analytic research. Descriptive part of the study mainly rely on 2011 enterprises survey from World Bank while the analytic part is derived from 2008/9 Large and Medium Manufacturing Survey data in which a sample of 1294 enterprises are drawn from a list of over 2172 SMEs. The study identified the type and size of enterprises that is more likely responsive for access to bank credit and examined the link between SMEs productivity and use of bank credit. Above all, this paper opens the door for future research in this area.

Key words: bank credit; enterprises; large and medium; productivity; SMEs

Introduction

It is more logical and understandable that Small and Medium Enterprises (henceforth SMEs) are more likely to be credit constrained than large firms (UNCTAD, 2001, [1]). In fact, this implies that the probability of being credit constrained decreases with firm size. Consequently, it is crucial to identify with the different factors that can help or hinder SMEs creation and development. Recent study results around the developing and developed world provides evidence that SMEs face greater financing obstacles than large firms (Demirgüç-Kunt, 2006, [2]). In addition to this, about with effects of credit access on SMEs productivity research results show that access to finance has a critical impact on SMEs productivity. But they differ in opinions about the direction of causality between access to finance and enterprises productivity. Some empirical evidences that forwarded by Gatti and Love (2006, [3]), Babajid (2012, [4]), Alfaro, et al (2009, [5]) concluded that credit is positively and strongly associated with SMEs productivity and performance. However, others disagree with the findings and asserted that the direction of causality between access to finance and SMEs productivity and performance run both ways, especially for developing economies (Ghani and Suri, 1999, [6]). Moreover, the details of the role of access to finance on the degree and pace of such changes on SMEs themselves are yet to be fully grasped; hence the link between SMEs productivity and use of bank credit is inconclusive, yet to be fully grasped. Further, what the precise channels are through which any finance to productivity performance effect operates remain unclear. Therefore, this study aims at filling the gap and it will extend previous studies by focusing on examining the impacts of access to finance on SMEs productivity as a candidate explanation to help bridge the gap using the empirical evidence from Ethiopia.

Background of study

Industrialization and private sector development strategies are important packages of any country that could be used to accelerate economic growth. Towards this development the contribution and role of Small and Medium

Enterprises (SMEs) are very essential (MoFED, 2010, [7]). The sector transforms a nation's resources (land, labour, capital, and entrepreneurship) into products and services to meet the needs of its people. Currently, SMEs contribution for economic growth in terms of creating employment, increasing GDP, and raising the nation's volume of exports have been widely acknowledged (Mead & Liedholm, 1998, [8]). Analytical economists, researchers and politicians are also frequently arguing and forwarding their recommendations that SMEs are vital for more intense, sustained growth and for establishment of more and better jobs which play a significant role to bring economic and social benefits (Agyapong, 2010, [9]).

With the goal of attaining economic growth in Ethiopia after the current government took power there are different economic policy initiatives that have been undertaken to promote the development of SMEs through privatization policy (Bekele & Worku, 2008, [10]). In other words, in Ethiopia the role of SMEs sector is highly acknowledged in employment creation, economic growth and poverty alleviation. As a result the issue of SMEs development given high attention and explicitly stated in the core country's strategic policy papers like Country Poverty Reduction Strategy, Micro and Small Enterprises Development Strategy and the Federal Food Security Strategy (MoUDC, 2013, [11]). Despite of all these initiative the ability for SMEs to fulfil their potential contribution in an economy is under expected. In addition to other limiting factors lack of access to bank credit is the main constraint that limits the performance and growth of SMEs (Brixiova, 2009, [12]).This implies that access to external finance in the form of bank credit is a vital input for the performance of SMEs in Ethiopia and worldwide.

Accordingly, many research results suggest that access to bank credit should lead to SMEs higher level of productivity (Love, 2003, [13], Lashitew, 2011, [14]). The justification for this is that access to bank credit may allow enterprises to have better capacity to acquire necessary working capital and technical inputs and that could allow firms to have favourable impacts on SMEs productivity and performance pattern.
As a result it is important and crucial to identify the effects of access to bank credit on the SMEs productivity in developing countries particularly in Ethiopia. This paper aims at filling the gap by investigating the effect of access to bank credit on productivity of SMEs. Moreover, the study will look at how well the productivity of enterprises that have access to bank credit in contrast with enterprises without access to bank credit. And also examine the level of importance of availing bank credit facilities for SMEs at its early stages or at the expanding stage.

Literature Review

The importance of finance access in the theories of economic development has been recognized and extensively discussed in the literatures. Researchers like Alfaro, el at (2009, [5]) have discovered that well-functioning financial market helps in lowering firms cost of capital and have a significant impact on the firms' productivity. Furthermore, financial market development is 'necessary and sufficient' to advance the 'adoption of new technologies. In other words, inadequate access to credit market restricts entrepreneurial development. If entrepreneurship allows better assimilation and adoption of best technological practices made available by FDI, then the absence of well established financial market limits the potential contribution of SMEs in terms of productivity and profitability.
 In general most of the researchers and policy makers believe that availability of access to efficient finance to any and all firms could help to improve productivity. This doesn't mean that just a matter of the overall volume of lending: it matters crucially which firms get finance and on what terms, that is, on whether credit worthy firms of all sizes, both incumbent ones and those that seek entry, have broad access to finance at reasonable costs. However improving access to external sources of funding or access to credit for SMEs are undoubtedly the main challenge for firms particularly in developing countries like Ethiopia, and that fact alone justifies the attention it receives. Naturally, it is also the area of finance that has received the most econometric research attention. The large number of academic studies has attempted to assess the determining factors of SMEs performance. In common most of them find out that access to finance are a key determining factor to enhance enterprises performance in terms of boosting their productivity. Nichter and Goldmark (2009, [15]), for example, found that access to bank credit is the main determining factors for the growth of micro and small enterprises. This result has similarity to those of several other studies Gebrehiwot & Wolday (2006, [16]); Lora & Pages (2011, [17]); Love (2003, [13]) and Wurgler (2000, [18]) all of them found significant results on the contribution of finance access on the SMEs performance.
On the other hand, the business value of access to bank credit on SMEs performance has been debated for the number of years. While some authors have attributed large productivity improvements and substantial contribution to access to credit, others report that credit access has not had any bottom line impact on the firms' productivity. However, with few exceptions, research in the area of enterprises business found that finance access has significant impact on the enterprises performance. There is stream of literature which analyze the impact of access to finance (bank credit) on SMEs productivity. For instance research conducted by Butler and Cornaggia (2000, [19]), Lashitew (2011, [14]), Badia and Slootmaekers (2009, [20]), Olutunla and Obamuyi (2008, [21]) analyzed the

impacts of access to credit on the enterprises performance in terms of productivity and/ or profitability. Most of these studies focus on either cross country analyses or in a specific sector and in one or other way they dealt with the impacts of credit access on SMEs productivity. They found that the impact of credit access on SMEs productivity was significantly higher for those firms which have access to credit than for other firms operating without access to credit. These empirical research works have commonly found that access to credit make a significant contribution to enhancing SMEs performance. For example, recent theoretical research work by Lashitew (2011, [14]) demonstrates that credit access used as firm level financial access, has significant negative effect on the cost of capital. This result confirms that access to credit allows firms to employ more capital in order to boost SMEs productivity and profit. Reduction in the firm's operation costs could come directly from investing in more productive capital equipment; increased demand could stimulate and improve the expansion on the enterprises level of performance. This study provides new evidence on the effect of financial access on firms' cost of capital using an international dataset that primarily covers small and medium firms in developing countries. The paper measures financial access using firm level indicators of credit access as well as country level indicators of financial development. The results show that both firm level measures of credit access and country level indicators of financial development reduce firms' cost of capital. Similar view is shared by Butler and Cornaggia (2007, [19]), in an experimental based study and examines the relation between access to finance and productivity at the county level. They adopted triple difference (DIDID) testing approach and found out productivity increases in countries with relatively strong access to finance and it implies a positive relationship between access to finance and enterprises productivity. More specifically their study illustrate that access to finance particularly bank loan has a strong effect on the firms' productivity and profitability. This result is statistically significant and robust to a variety of controls, alternative variables, and tests and the findings show how access to finance can have a positive impact on enterprises productivity. Other significant research study done by Badia and Slootmaekers (2008, [20]) reveals new evidence on the link between finance access and firm level productivity in a country specific case. It explains the role of financial constraint and developed a methodology that corrects for misspecification problems of previous studies. The result shows that young and highly indebted firms tend to be more financially constrained. More importantly they found that for most sectors financial constraints do lower firms' productivity where the dampening effect of financial constraints on productivity is remarkably large. These results are robust to a variety of sensitivity tests.

Other empirical researchers in their respective work also investigated the relationship between access to finance and SMEs productivity in specific country context. One of the strongest empirical evidence that forwarded by Gatti and Love (2006, [13]) discovered the causal effects of access to finance upon firms productivity. To explore such issues the researchers used data from a cross section of Bulgarian firms; they estimated the quantitative effect of access to credit on SMEs productivity. The investigators also typically assessed the statistical significance of the level of SMEs productivity, that is, the degree of confidence that the true relationship is close to the estimated relationship and concluded that credit is positively and strongly associated with TFP.

Research Problem

In Ethiopia, defining the research problem of SMEs may begin with a consideration of the typical characteristics of access to finance. Most SMEs not have access to finance to perform well in the production process. Lack of access to formal finance together with other business uncertainty environment often leads SMEs to serious problems towards productivity performance.

To sum up, in Ethiopia, the problem that SMEs face appears to be lack of access to finance and it has adversely affected SMEs productivity. Therefore, the problem to be addressed in this research is to investigate the effects of access to bank loan on SME productivity, and then, to determine the best measures for improving SME productivity in Ethiopia by availing finance access efficiently. Figure 1 represents the fields of research problem in this study.
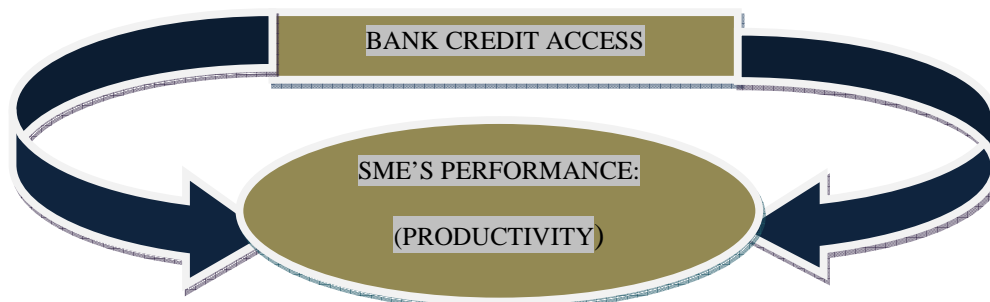
Figure 1. Fields of the research problem

Source: Developed for the study

Objective of the study

The key objective of this study is to find out whether or not access to finance, in the form of bank loan, is influence on the SMEs productivity. In other words, the study examines and assesses the effects of access to bank credit on the SMEs productivity particularly in Ethiopia. The nature of the topic dictates the use of both a chronological and a comparative analysis among SMEs. This will help to examine SMEs performance with respect to the level of SMEs productivity attributable to the bank credit variable.

Research questions of study

With the above given objective, this paper tries to answer the following research questions
- How does bank credit access affects SMEs total factor productivity growth in Ethiopia?
- Which enterprise types are satisfied with bank credit access they have and which ones are credit-constrained?
- How well the performance of enterprises that have access to bank credit in contrast with enterprises without access to bank credit in Ethiopia?

Methods and Materials of study

The research questions that the researcher wants to answer can determine the type of research design. This research study is designed to describe the effects of access to bank credit and its impact on SMEs productivity. Thus, "descriptive" is viewed as an appropriate research type. Also, this research is designed to identify the how access to finance affect the level of SMEs productivity. Thus analytical or normative research is also implemented in combination with descriptive research. Thus, for this research both analytical and descriptive research type has been used. Moreover, secondary data method is used to examine the effects of access to bank credit on the SMEs productivity that is estimated in terms of Total Factor Productivity level.

Population and Sampling Methods

This paper developed based on information source drawn from detailed data set generated by the Large and Medium Enterprises Survey of 2008/9 and Enterprises Survey of 2011 conducted by Central Statistical Agency (CSA) of Ethiopia and World Bank (WB) respectively. The dataset consists of detailed information on access to credit, access to output market both local and export, sales, use of energy and raw material, level of employment, investment, depreciation and stock of capital, ownership type, number of years in business and the conditions of accounting record keeping. In this study, SMEs in selected region and city are defined as the target population from where the sample was drawn for research. However the study only focuses on manufacturing enterprises which have more than ten employees and operates with and without bank loan as a sample unit.

The study sample is further reduced by two additional issues. First, the researcher wants to focus on manufacturing SMEs while records concern all SMEs. In other words, the study does not cover non-manufacturing SMEs (e.g. in agriculture). Hence, the study ends up assessing only the performance of manufacturing SMEs which operate with

and without access to bank credit. A second issue is related to enterprises size. This study however, focuses only on enterprises with employment level of more than 10 people are considered.

The population and sampling framework adopted for the study and discussed above may be described by the visual way as in Figure 2 below.
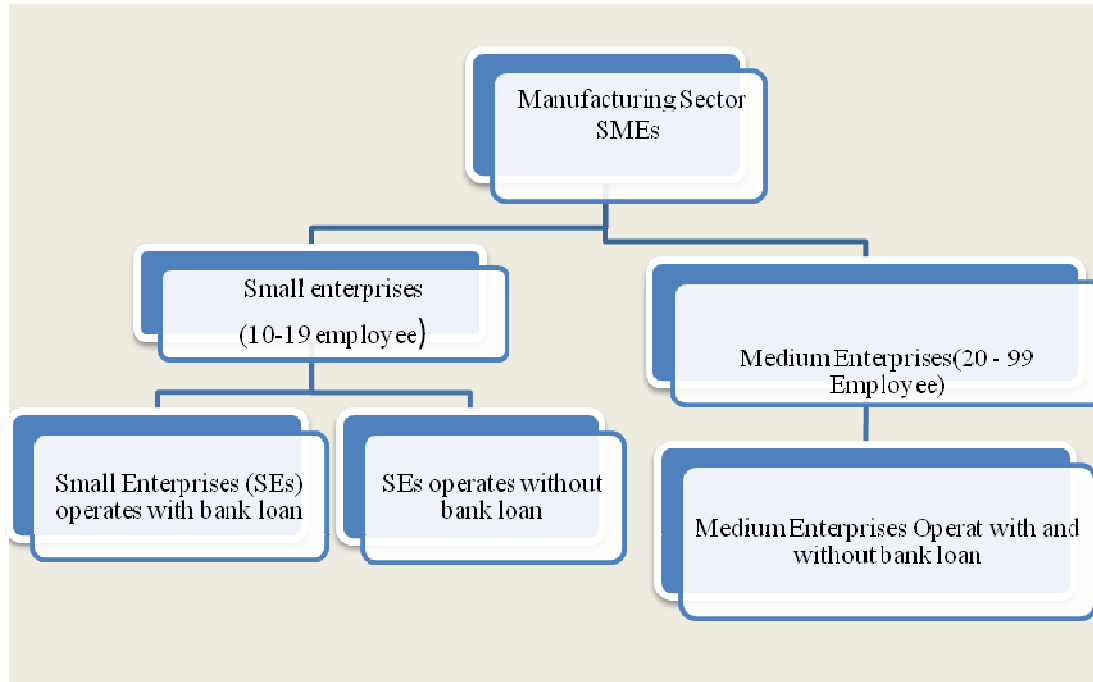

Figure 2. Analytical model for the research study
Source: Developed for the study

Methodological Framework

The analytical model for this research, which ultimately provides structure to the empirical chapters, is illustrated in figure 3. This analytical frame work represents the model of the effects of access to bank loan on SMEs productivity. The model demonstrates that SMEs productivity is expected to be positively influenced by efficient access to bank credit practices. In addition figure 3 below helps to illustrate the systematic ways to test for the hypothesis. First, SMEs that have employers more than 10 people are identified. With these, two groups of enterprises are formed. First group includes firms that have access to bank credit and the other one firms use informal sources of finance for its normal operation. Under the assumption that banks can offer better credit terms, it is examined whether firms with access to bank credit have relatively higher levels of total factor productivity than the other group of firms.
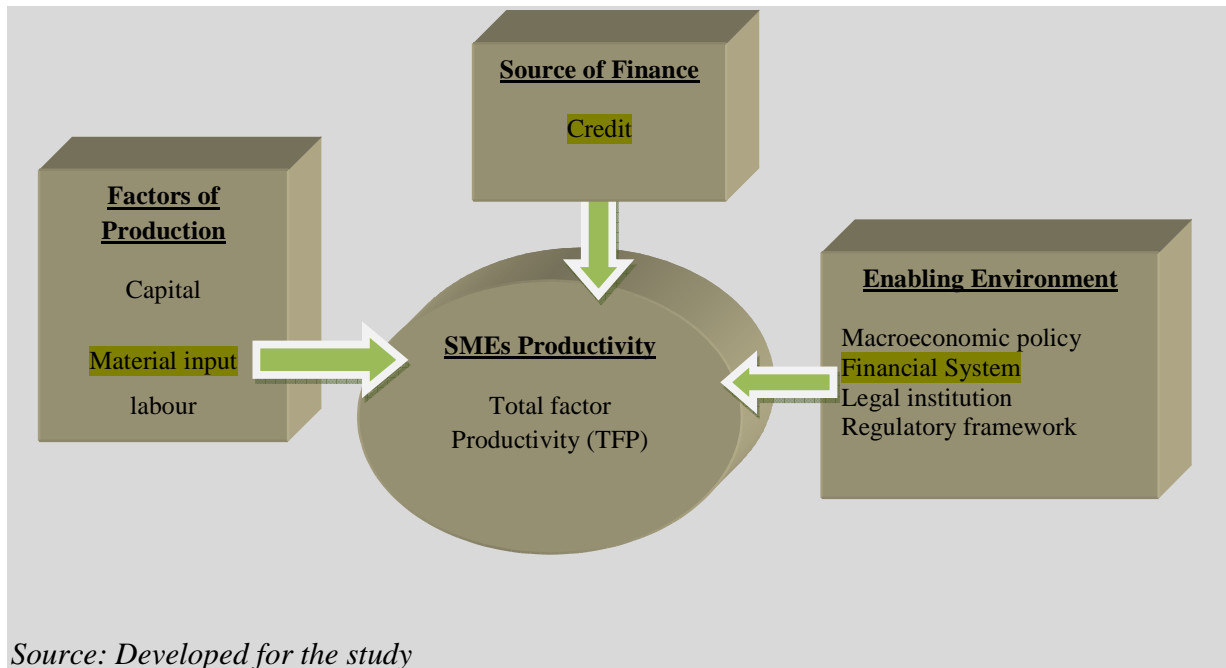
Next page

Source: Developed for the study

Figure 3. Study Framework (Model of loan and productivity)

Enterprises Financing Sources for Investment: A Descriptive Analysis

A close look at the enterprises financing source for their investment, what type of finance are identified as the top sources of finance for their operation? As can be seen from the pie chart below it is highly skewed to the internal sources of finance and the 2011 enterprises survey result indicates that enterprises excessively rely on internal finance for their business operation. This is logical to the argument that inefficient financial market increases the reliance on internal source of finance. According to the survey result presented in chart 1 below indicate that 86.3% of small firms operation covered by internal source of finance and it implies that the vast majority of small firms did not have access to bank loan as only 8.2% of the finance source was from the bank. This appears to be in agreement with the idea that enterprises that lack access to bank credit rely on internal source as a substitute

***Chart 1. Sources of Finance and percentage of SMEs reporting them as primary***
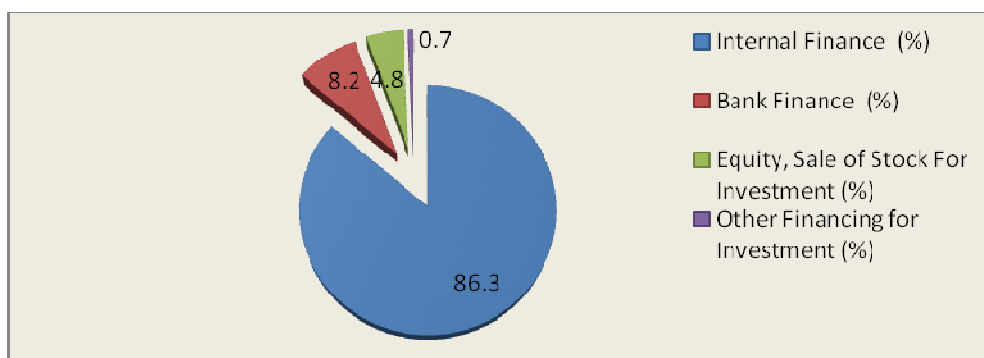
Source: World Bank Survey Data 2011 and author's calculation

Access to Bank Loan by Firms' Size

As can be seen from chart 2 the distribution of bank loan across firms based on their size. It is highly skewed to big and medium firms. Accordingly, 73% of enterprises in the 3rd and 4th sales quintile had access to bank loan where as 67% of firms in the 1st and 2nd sales quintile did not. In general banks tend to lend more to big enterprises. In terms of industry groups this translated to greater access to industries with a few big enterprises and the opposite to industries with many small firms. In a well-functioning credit market this should imply a higher level efficiency among the big firms. Whether this holds true is further investigated using an econometric analysis.

Chart 2. Percentage of Enterprises with Access to Bank Loan
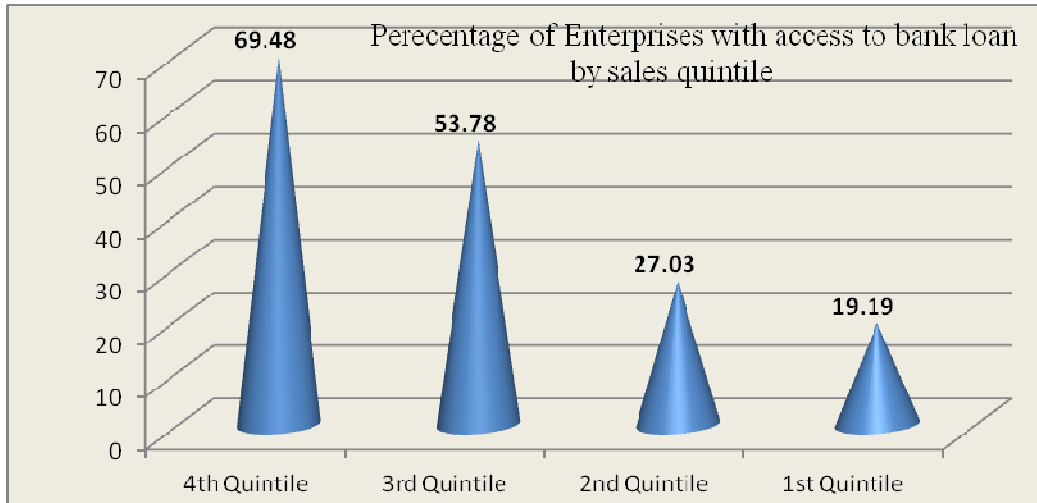
Source: CSA Survey Data 2009/10 and author's calculation

As we can see from chart 3 below the set of indicators focuses on the use of financial services by big and small firms' shows that both big and small firms relay on internal fund source however, in relative terms large firms use bank loan better than small enterprises. The chart also presents the percentage of investment that is financed by different finance sources with respect to firms' size. Big firms have better experience in using external source of finance than the small one. In general the chart below show that there is excessive reliance on internal funds by both big and small firms and it is a sign of potentially inefficient financial intermediation in the country Ethiopia.

Chart 3. Sources of Finance for Enterprises that used based on their size
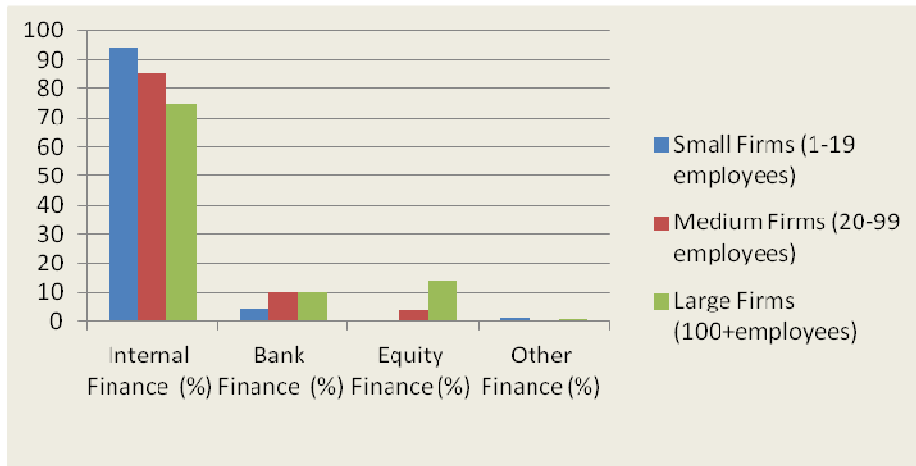
Source: World Bank Survey Data 2011 and author's calculation

Normative or Analytic Analysis of the study
Regression Model

By applying Nerlove's (1963, [22]), basic model, the researcher start the analysis by specifying a Cobb Douglass production function that captures the relationship between inputs, efficiency and output.

$$\text{Eq. (1)} \qquad q_i = f(L, K, M) = A L_i^a K_i^b M_i^c$$

Where, output q is a function of three input variables, labour (L), capital (K) and material inputs (M), and A is a constant. The parameter a, b, c and A are all positive constants calculated from empirical data. This function helps to determine what happens to the output if enterprises operate with and without access to bank credit. By assumption enterprises use bank credit to buy capital and material inputs.

Taking the log of this equation and adding an error term (e_i) yields the equation estimated by Mark Nerlove (1963)

$$\text{Eq. (2)} \quad \ln(q_i) = \ln(A) + \alpha \ln(L_i) + \mu \ln(K_i) + \beta \ln(M_i) + \varepsilon$$

$$\text{Eq. (3)} \qquad y_i = \beta_0 + \alpha x_{1i} + \mu\, x_{2i} + \beta\, x_{3i} + \varepsilon$$

Where $y_i = \ln(q_i)$; $\beta_0 = \ln(A)$, $x_{1i} = \ln(L_i)$; $x_{2i} = \ln(K_i)$; $x_{3i} = (M_i)$. The above regression equation will give

the estimated values of Total Factor Productivity (TFP) by considering the enterprises operation with and without bank loan.

In this model the researcher is interested in examining the null and alternative hypothesis

$H_0 = 1$ (the null hypothesis that access to bank credit enhances SMEs total factor productivity) or

$H_1 \neq 1$ (the alternative hypothesis that asserts access to bank credit does not enhances SMEs total factor productivity). One simplifying assumption considered in this study is that enterprises use bank loan to purchase material inputs new capital intensive technology.

Regression Analyses Results

Table 1 shows the independent variables estimation results which is presented below that the dependent variable and independent variables are in natural logs the coefficient on the logged independent variable is the elasticity of the un logged dependent variable with respect to the un-logged independent variable. The regression exercise affect on the input output variables that directly applied to the production function and the model estimated statistically significant coefficient on a given major production inputs (labour, capital, material inputs, energy and others). Respectively the exercise revealed that high return to capital among enterprises operates without bank loan. It implies that a 100% increase in the value of capital input is predicted to results in 7% increase in the value of output of enterprises no access to bank loan vs. 4% increase in the loan recipient enterprise group

see Next page

Table 1. **Production function estimated with and without access to bank loan using the variable labor, capital, material input, energy and other relevant inputs**

Variables	Coefficients (with credit)	Coefficient (without credit)
ln_wage	0.215** (11.87)	0.179*** (11.73)
ln_capital	0.0449*** (4.73)	0.0673*** (6.25)
ln_material	0.618*** (45.89)	0.599*** (45.53)
ln_energy	0.0750*** (5.92)	0.0888*** (6.98)
ln_other~s	0.0574*** (5.19)	0.0380*** (3.67)
_cons	1.546*** (11.14)	2.011*** (15.51)
N	565	729
R-sq	0.963	0.943

Standard errors are reported in parentheses.
(t statistics in parentheses)
* p<0.05, ** p<0.01, *** p<0.001
*, **, *** indicates significant level at the 90%, 95% and 99%

Table 2. **T –test on the difference in mean TFP across enterprises with and without Bank loan**.

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
without	812	8.319498	.2689347	7.663458	7.791608	8.847388
with	598	5.144429.	.1573912	3.84885	4.835321	5.453537
combined	1410	6.972908	.1737037	6.522568	6.632163	7.313654
diff		3.175069	.3116053		2.563747	3.786391

diff = mean(no) - mean(yes)   t =10.1894
        Ho: diff = 0   Satterthwaite's degrees of freedom = 1260.77

        Ha: diff < 0   Ha: diff! = 0   Ha: diff > 0

   Pr(T < t) = 1.0000   Pr(|T| > |t|) = 0.0000   Pr(T > t) = 0.0000

In other words the regression analysis result shows that the estimated value of the variables have a higher return to capital among enterprises operating without bank loan. This result implies that there is relative scarcity of capital in enterprises operating absence of bank loan which are at the same time concentrated in the industry groups with numerous but small firms; capital being in short supply in small firms which is sensible. The table also shows higher returns to labour among enterprises operating with bank loan. This indicates that relative scarcity of labour in enterprises operating with bank loans which are at same time concentrated in the industry groups dominated by a few big firms. It means labour is expected to be relatively scarce in big firms. In general enterprises with increased revenue productivity will have higher demand for capital since; each unit of capital will produce more return. An increase marginal cost of labour will also increase the demand for capital it means the substitution labour for capital will be inhabitable. From the above table we can also observe that there is very high return to raw materials in both enterprise groups which operate with and without bank loan. In other words return to raw material inputs is significantly large in both groups; approximately 62 % in the loan recipient group and 60% in the other group taking

average of the coefficients from the above given models. This is further supported by enterprises' perception from the survey; 33% and 35 % of enterprises in loan recipient and non-recipient groups' respectively perceived shortage of raw material as a priority. Possible reasons for the very high return on raw materials might be because of the patterns of input use and conditions of exchange rate; respectively production function estimated using the variables capital, labour, raw materials, energy and other industrial inputs.

Graph 3. A comparison of mean of TFP across regression models by access to loan
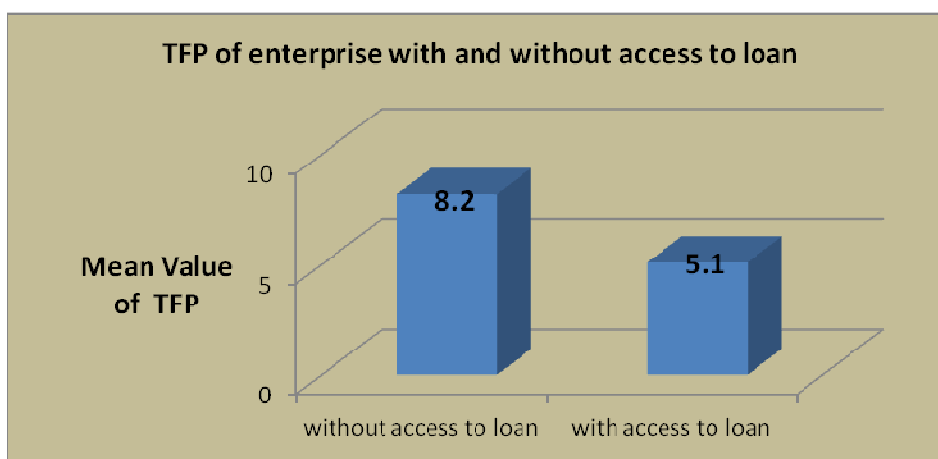
Source: CSA survey data and author's calculations

The above graph 3, illustrates that the average total factor productivity (TFP) among enterprises that operate without access to bank loan is 1.6 times higher in the input output estimation model. In general the differences in means are statistically significant. The results show a clear pattern where banks lend to enterprises with lower level of efficiency as measured by average TFP and lower rates of return to capital. Possible causes might be also the absence of well established investment opportunities for SMEs in Ethiopia that may lead firms to divert credit to non-investment uses, for instance the financing of daily operations. Thus, the channel of transmission from credit to productivity is the efficiency. Conversely banks do not lend to where efficiency and the rate of return on capital are higher. However, further analysis will be necessary in order to discover the reason behind the regression results.

Conclusion

To emphasize the importance of access to bank credit practices on SMEs productivity the hypothesis of difference in mean of TFP of two groups of SMEs is tested. The result of testing indicated that the mean of TFP value for SMEs that are operating with access to bank credit is lower than that of SMEs are "not efficient" in access to credit practices. This result is empirical evidence to demonstrate SMEs that they should pay more attention to availing access to bank credit practices if they want to improve their productivity and survive in the uncertain business environment in Ethiopia. However, this research shows a preliminary result of the analysis and it will have a continuity so further analysis will done and the reason behind this investigation will be explored.

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